RIMAGE®

The X5 Copy System by ✕ NET

"The first copy system that keeps track of which data is stored at which location on which media at which time."

X5 IS THE ONLY SYSTEM FOR THE PRODUCTION OF VARIABLE FLASH MEDIA THAT CAN SIMULTANEOUSLY RECORD UP TO 240 SSD, USB, CF, MICRO-SD ETC. WITH INDIVIDUAL DATA. JUST-IN-TIME COPYING ENSURES THAT THE RIGHT STORAGE MEDIA IS RELIABLY AVAILABLE AT THE RIGHT TIME, IN THE RIGHT PLACE.

Introduction

With over 25 years of experience Rimage is a world leading supplier of CD/DVD Robotics and complete media solutions. Now we use our deep knowledge of individual disc publishing and the partnership with X-Net to create the fastest and most versatile flash production solution on the market.

Together with X-Net, a innovative IT company with the vision to make new technologies from the Open Source area available to SMEs, we are proud to distribute a flexible, module based 19" rack mounted flash publishing system that can be integrated into workflows or used standalone .

The X5 offers total flexibility of media types and can grow in scale with the demand. The main focus of the system is on secure, individual high speed production.

X5 is designed to be deeply integrated into customer workflows and to deliver media, labels and related paper documents from a single source.

X5 outperforms existing Flash Copy Towers by far in speed and flexibility.

5 ATTRIBUTES FOR THE RIGHT COPYING SYSTEM

SECURE
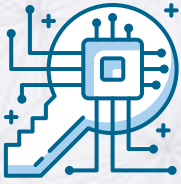
Each data carrier can automatically be recorded with unique data (e.g. encryption, individual software key). This allows highest security standards as each mass product is delivered with customised software. If one gets hacked, products from the same series will not be leaked too, as they can have different individual specifications.

INDIVIDUAL

X^5 automates the production of 1:1 copies integrated into the environment of mass production. Before the actual copy process starts, X^5 pools data together from different sources (e.g. file server, databases, ERP, PPS) and prepares data individually for one (1:1) or many (1:n) data carriers. Various data preparation processes (e.g. document production, matching of data, encryption, video formats) are supported.

SCALABLE

Hardware and software are designed modularly. The number of recording modules can be adjusted according to the required throughput and data volume. A later extension of additional modules is possible. Recording jobs can also be distributed among several X^5 systems.

DIFFERENT DATA CARRIER

Recording on different types of data carrier happens parallel through using adapters and/ or various modules. The system automatically recognises the type of medium and starts the defined recording process. Media sets can be recorded in one working process.
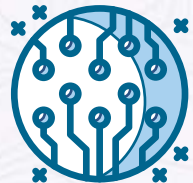
JUST-IN-TIME AND ASYNCHRONOUS

Recording (and validation if required) of data take place asynchronously. The copy process starts immediately after insertion of a data carrier and/or all information concerning the product is available in the centralised data storage.

Idle periods while loading or unloading X^5 are reduced to a minimum. Reliability is increased as faulty copy processes are taken over through other slots immediately.

The clustering of (de-centrally located) X^5 systems enables peak production. Data carrier are recorded on demand and contain respective data assigned to different products. Each slot indicates completion individually and can be assigned to the corresponding product accurately.
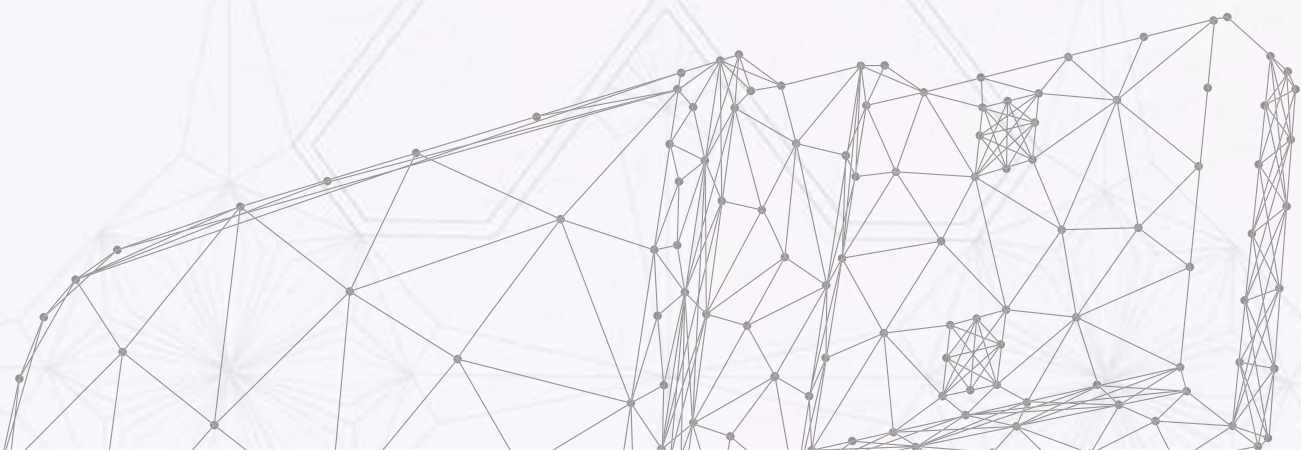
X5 IN A NUTSHELL - NOT A SIMPLE COPY TOWER

Supported types of flash media:
USB, SD, Micro SD, CF, SSD, EEPROM...

Modular system:
10 ports per module, more modules can be added

Powerfull SW:
Open RC can be used via WebClient or totally integrated via API into existing workflows

High Security Concept:
Linux based - verification of every recorded stick - flexible WORM features

Individual Publishing System:
Full speed on every port - asynchronous recording - parallel independent jobs

Usefull Add-ons:
Different label printers from B/W Brother to full color Zebra as well as barcode scanners

TYPICAL USE-CASES

Internal production & SW Deployment

- In industrial production X5 systems optimize the possibilities to deploy always latest and per order individualized SW to the produced devices
- Every device can have individual SW and encryption. This prevents hacking and simplifies production workflows

ONE SYSTEM - MANY POSSIBILITIES

Customised for your requirements, X^5 can be used for a variety of applications where any type of individual physical media is needed. Flexible Media support for old, current and future formats.

One X5 can replace several copy towers and outperforms them in speed and media flexibility

Government

- The X5 system enables high security production of confidential data with individual encryption

Fulfillment Services

- Customers can produce flexible media types on demand 1:1 or 1:x
- Each medium can be labeled individually with text and barcode
- X5´s Open RC SW can also produce all related shipping documents

Outsourced production

- The X5 system allows cost efficient outsourced production and ensures full SW controll
- X5 can be used at the production location but all data is controlled remotely by the client
- All data is encrypted on the X5 system. Remote location cannot modify any data

FIT FOR INDUSTRY 4.0

X^5 - copy systems are designed to support customised workflows and copy processes tailored to our customers' specific needs. Application ranges from automatic storage of individual product-specific data to Just-in-time production and simple copy processes. When implementing a storage process we consider and incorporate your entire production workflow and adjust the X^5 - copy system to your specific needs.

In addition to recording and verifying the data on data carriers, encryption mechanisms, authentication processes and communication security are also taken into account. That is why the X^5 system can be used worldwide. The combination of special software and hardware components allow individual security strategies that cover the whole life-cycle of a product.

UNINTERRUPTED COPY PROCESS

Every single one of the up to 80 slots is used asynchronously and records data on different storage media with up to 200 Mbyte per second. After the recording process, a validation of the data takes place. The recording of special security media (e.g. dongles) is supported. In case of faults (defective or faulty data carrier) in one slot, all other slots are still working without any impact. Faults are displayed immediately and the affected recording process is continued in another slots or after removal of the defective and insertion of a new data carrier.

SIMPLE HANDLING

X^5 is controlled over web interface. Therefore, a monitor and a keyboard are connected (e.g. a table PC). LEDs at each slot display the status of the production. The flexible interfaces and adjustable software plug-in mechanism facilitate optimal integration of the X^5 copy system into a company's workflow, e.g. through connection with central ERP or PPS systems.

SUSTAINABILITY

The X^5 copy system is the most flexible storage media management system on the market. The use of adapters enables the simultaneous storage of data on various media types or on media sets. This ensures that the X^5 can be geared up for future generations of media. X^5 copy systems can be extended with additional features and modules subsequently. Long term availability of components and spear parts ensure a long life time.

SOFTWARE

The software framework with OpenRC has a very flexible interfaces. This allows different data sources, job orders, upstream and downstream processes, etc. to be connected easily and flexibly. The display can be adapted to customer-specific conditions through adapted workflows and processes. Signal lamps and On-screen overviews show the current status of production in real time and enable easy operation by the responsible employee. Three areas, Touch Screen, Web Interface, SW Interfaces (XML, REST), are available to to check the X^5- copying system and to monitor the status of each single data carrier.
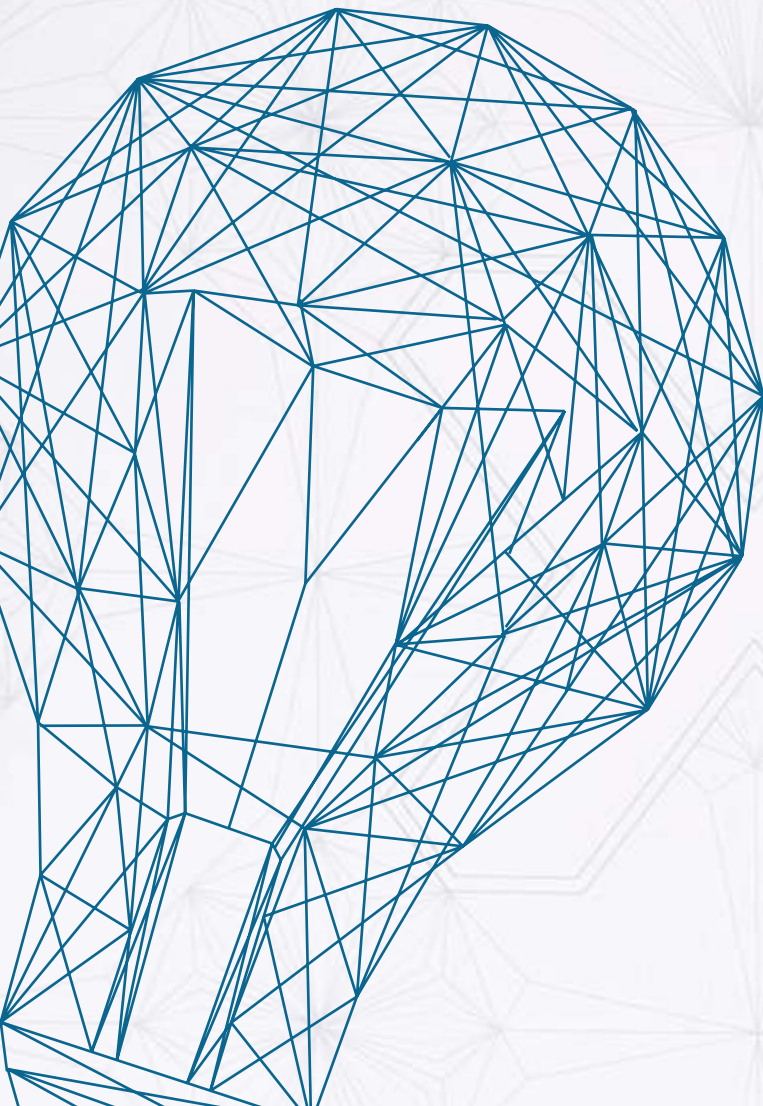
CASE STUDY AUTOMOTIVE

Bosch is a leading global provider of technology and services and, as an innovative IoT company, provides solutions for smart homes, smart cities, networked obility and connected manufacturing.

Challenges

The company has invested more than two years in finding a suitable copying system that should meet both high security requirements and specific functionalities. A large amount of SSD media (> 5000 per day) should be recorded timely and tested with up to 100 GB data. One of the basic requirements was that no incorrectly recorded or defective medium should enter the production process. Faulty media should be detected by special quality checks and subsequently be corrected. Added to this a complete recording of the process as well as the gapless traceability of each medium (which medium/serial number has been recorded and verified with which data content at which time on which system) was required. The system was to be integrated into the existing production control system in order to prepare this data in a way that was easy to understand and to ensure the quality assurance of further workflows.

Solution

The IoT-Company has uses the X5-system for recording and verifying SSD memory cards for CarMultimedia systems since 2014. For the realisation of an inline production, a special workflow has been developed, which enables the copying and verification process at the point where the storage medium is installed in the final product.

One X5-system records, verifies and checks up to 4,000 SSDs per day. Incorrectly recorded SSDs are automatically identified by the control process, reported to the production control system and thus do not enter the production process. At the same time the recording process of the remaining media happens continuously. The advantage of inline production lies in the high degree of flexibility of set-up times, as new software updates are immediately introduced into the production process without long lead times. Besides, a clear correlation between product and medium is created. Bosch uses the X5-system in a cluster of several cabinet systems in 24/7 operation.

Outlook

Thanks to the modular design of the X5-system Bosch is able to create a uniform Group quality standard through global expansion. In a further step, the respective productowner can be granted access to the repository of the recording system. Thus, the productowner can manage its product software autonomously and release it for recording. In the future, it will be possible to create product-specific media inline, whereby the production control system specifies which contents should be on which medium and at what time these media must be made available for assembling (just-in-time production).

ADVANTAGES

- Inline production
- High quality assurance through multi-level controls
- Integration into existing production systems
- Creating a (corporate) standard
- Just-in-time production
- Logging of all accesses
- High flexibility of set-up times
- Clear assignment between medium and product

CASE STUDY MECHANICAL ENGINEERING

In the current case study the highest possible protection of the production assets against future attacks should be achieved by means of individual encryption.

Challenges

Currently, most manufacturing companies use traditional duplication systems (1: n copiers) to produce encrypted media (CF, Cfast, SD, microSD, SSD, ..) for their products. However, due to the 1: n reproduction all media have the same encryption. A variation of the encryption usually takes place during the first boot process. The key is integrated into the product in the form of a so-called dongle as a USB or FPGA variant.

In the future, many products will be vulnerable to attack due to the continuous development of modern decoding processes. This enables targeted attacks on the functionality of the products and threatens the sovereignty of companies.

Solution

The X5-system enables the direct integration of individual single encryption into the production process. Using a variation of individual characteristics, each product receives an individual key and, if necessary, a variation of individual subkeys. If the key calculation for product A was for example based on the MAC address, processor ID and serial number of the CF-card, with product B the basis for the calculated key could be the RFID tag of the housing, a special ID of the microcontroller, the microSD card and the processor ID.

An individual single encryption requires the encryption of all data in the production process and a direct assignment of a data carrier to a product. A just-in-time production of the data carrier is therefore required. By interfacing the X5-system with the production control system, product-specific features as well as the required completion time of data carrier production can be transferred to the X5 system. This takes care of encryption, just-in-time production and quality control. Added to this is the archiving of images and raw data and the distribution of this content in an (global / corporate) X5 cluster.

Outlook

The X5-system will set new standards in the encryption and protection of manufactured goods. How the encryption is composed and on which variation it is based on remains the secret of the manufacturer. The X5-system and its open standards is the ideal platform to build and integrate complex and high secure systems.

ADVANTAGES

- Individual single encryption
- Variation of the number and position of the keys
- Use of post-quantum cryptography
- Just-in-time production
- Access to the images only possible via X5
- Logging of all accesses
- Automatisation of the required completion time
- Global/corporate security standard for the distribution of software

COMPARISON WITH STANDARD COPY TOWER

Depending on your needs, X5 can be used for different requirements in of the individual storage media production is used and exceeds the performance of a normal Copy Tower by far.

In the table we have compared the various features of the X5 and a copy tower. It stands out that the X5 system can be used for different types of media and has a clear speed advantage over a copy tower.

If you are alternatively looking for a pure USB system that is fully automated and has an integrated printer, we can recommend you the Rimage Maestro System. If you have an questions on the Rimage Maestro System you can either check our website or get in contact with your local Regional Business Manager.

Features	X5	Standard Copy Tower
Design	Modular, manual System	Manual System
Ports	10-80	10-100
Fully automated	No	No
Media	USB, SD Cards, HDDs, EEPROM, ...	Different systems for different media
Copy Mode	1:1, 1:x asynchrone	1:x synchrone
Print	Offline	No
Printer	Different Label Printers	No
PC	Integrated	Requires Control PC
SW	Open RC	Proprietary
Operating System	Linux, can be used in Windows Network	Windows
Speed per Port	FAST - Full 200MB/s on every USB Port Asynchrone	SLOW - Speed shared by all ports (mostly only 20 MB/s in reality) Synchrone – slowest Sticks defines max speed
Integration	Open RC API	No
Consumables	All kinds of Flash-Media (USB, SD, CF, SSD...)	All kinds of USB sticks
Target Audience	Customers who look for a fast & secure way to deploy individual SW on manufactured HW devices	Customers with simple Duplication needs 1:many
Target Markets	SW for systems in production, Forensics, SW Distribution, Marketing, ...	Marketing, SW Duplication
Price	Starts at 15.000 €	Flexible
Pros	• High volumes – can grow with Modules • Extremely fast • Flexible media (different Adapters) • Write Protection, Data Encryption • Deep Workflow Integration • Attach multiple devices: (X5 Label Printer, Barcode Reader, Paper printers...)	• CHEAP • Very easy to use • Compatible with most USB Sticks • Perfect for many identical copies
Cons	• Apparently high purchase price • Full value needs workflow integration	• 100% Manual • No 1:1 production • Very slow compared to X5 • No print options • No workflow integration • Only 1 media type per system

TECHNICAL SPECIFICATIONS

19" Copy module

- Main memory: 16 GB RAM
- CPU: Intel Xeon Silver
- 1TB M.2 SSD cache storage per module (High Speed PCI-E)
- Number of Slots: 10
- Max. write speed per slot: 200 MB / sec
- 1 HE 19" standard size / 400 mm depth

Copy system

- Individually configurable
- Max. number of copy modules (per X5 – System): 8
- Display: 19" touch-screen
- Printer can be integrated
- 19" rack available in different heights

SOFTWARE SPECIFICATIONS

- Multiple interfaces (JSON, REST API)
- Supports writing directory structures or image to the devices (USB, SSD, SD, ...)
- Verification (data integrity can be checked after writing)
- User friendly webinterface with support for all device sizes (pc, tablet, mobile phone)
- Orders can be created with the easy to use web order creator or using our json order format
- Extremely customizable orders via our advanced json order format (e.g. partitioning, file system, data from multiple sources, ...)

- REST API for status of components and orders
- Based completely on open source software
- Customer gets the full source code
- All components can be adapted to the customer's needs
- Linux operating system (Ubuntu)
- Implemented in python
- Installation and support can be done completely remote

Rimage Europe GmbH
Wernher-von-Braun Str. 9
63303 Dreieich-Offenthal
GERMANY
Tel | +49.0.6074.8521.0

In cooperation with:

NET Spittelwiese 15
4020 Linz
Austria